

## CLAIMS

1. A method for the reduction of the volume of solid/liquid dispersion or suspension, said method comprising the steps of:

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- (a) providing a receptacle comprising at least one permeable or semi-permeable membrane;
- (b) introducing said solid/liquid dispersion or suspension into said receptacle; and
- 10 (c) applying a mechanical force so as to substantially expel said liquid and compact the solid residue;

characterised in that the application of said mechanical force comprises the application of pressure to said solid/liquid dispersion or suspension by means of at least one solid mechanical member, the magnitude of said pressure being increased during the process.

2. A method as claimed in claim 1 wherein said solid/liquid dispersion or suspension comprises a slurry of a solid material.

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3. A method as claimed in claim 2 wherein said slurry comprises an aqueous slurry.

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4. A method as claimed in any one of claims 1, 2 or 3 wherein said solid/liquid dispersion comprises a waste material.

5. A method as claimed in claim 4 wherein said waste material comprises a waste material generated in the nuclear industry.

30 6. A method as claimed in any one of claims 1 to 5 wherein said receptacle comprises a cylindrical container.

7. A method as claimed in claim 6 wherein said cylindrical container comprises a barrel.
8. A method as claimed in any preceding claim wherein said permeable or semi-permeable membrane comprises a filter.
- 5 9. A method as claimed in claim 8 wherein said filter comprises a woven metal mesh material.
- 10 10. A method as claimed in any preceding claim wherein said permeable or semi-permeable membrane is integrated into the surface of the receptacle.
11. A method as claimed in claim 10 wherein said permeable or semi-permeable membrane is comprised in the base of said receptacle.
- 15 12. A method as claimed in any preceding claim wherein said permeable or semi-permeable membrane is additionally comprised in the top and/or sides of said receptacle.
- 20 13. A method as claimed in any preceding claim wherein said application of a mechanical force to substantially expel said liquid from said receptacle and compact said solid residue provides an increase in the pressure applied to said solid/liquid dispersion or suspension.
- 25 14. A method as claimed in claim 13 wherein said increase in the pressure applied to said solid/liquid dispersion or suspension is achieved gradually by the action of at least one solid mechanical member on said dispersion or suspension.

15. A method as claimed in claim 14 wherein said at least one mechanical member comprises at least one inflatable member located within said receptacle.
- 5 16. A method as claimed in claim 15 wherein said at least one inflatable member comprises at least one air bag.
17. A method as claimed in claim 15 or 16 wherein said at least one inflatable member is inflated by the ingress of compressed air.
- 10 18. A method as claimed in any one of claims 15 to 17, wherein said at least one inflatable member additionally comprises at least one rigid member.
19. A method as claimed in claim 18 wherein said at least one rigid member
- 15 comprises at least one base plate.
20. A method as claimed in claim 19 wherein said at least one base plate is comprised of metal.
- 20 21. A method as claimed in any one of claims 1 to 14 wherein said mechanical force is applied to the top of the receptacle.
22. A method as claimed in claim 21 wherein said mechanical force is applied by the action of a rigid member
- 25 23. A method as claimed in claim 23 wherein said rigid member comprises a piston or hydraulic ram.
24. A method as claimed in claim 23 wherein said rigid member is comprised of metal.

25. A method as claimed in any one of claims 22 to 24 wherein said rigid member includes holes or grooves adapted to further facilitate the egress of liquor from the system.
- 5 26. A method as claimed in any preceding claim wherein the pressure applied to the solid/liquid dispersion or suspension is in the region of 5-200 bar.
27. A method as claimed in claim 26 wherein said pressure is in the region of 10-50 bar.
- 10 28. A method as claimed in claim 26 or 27 wherein an initial pressure in the region of 5-20 bar is applied to said solid/liquid dispersion, and said pressure is increased to a level of 100-200 bar.
- 15 29. A method as claimed in any one of claims 1 to 25 wherein a pressure of 300 bar is applied to achieve maximum compaction.
30. A method as claimed in any preceding claim wherein further permeable or semi-permeable membranes are comprised inside said receptacle.
- 20 31. A method as claimed in claim 30 wherein said further permeable or semi-permeable membranes are provided by means of a plate filter.
- 25 32. A method as claimed in claim 31 wherein said plate filter comprises an internal cavity and surfaces comprising permeable or semi-permeable membranes.
- 30 33. A method as claimed in claim 31 or 32 wherein said plate filter comprises a disc comprised of metal and having an internal cavity, wherein the top and bottom of said disc are permeable and comprise metal filter media.

34. A method as claimed in any one of claims 30 to 33 wherein means are provided for the removal of liquor which has been filtered through said further permeable or semi-permeable membranes.

5 35. A method as claimed in claim 34 wherein said means for the removal of said liquor comprise hoses which are attached to said plate filter such that the expressed liquor may be directed away from said internal cavity.

10 36. A method as claimed in claim 35 wherein said hoses comprise reinforced metal hoses.

37. A method for the reduction of the volume of solid/liquid dispersion or suspension, said method comprising the steps of:

15 (a) reducing the volume of said solid/liquid dispersion or suspension according to the method as claimed in any preceding claim; and  
(b) compacting the receptacle by the application of a further mechanical force.

20 38. A method as claimed in claim 37 wherein said further mechanical force comprises very high pressure.

25 39. A method as claimed in claim 37 or 38 wherein said further mechanical force is applied by the direct mechanical action of at least one solid mechanical member.

40. A method as claimed in claim 39 wherein said at least one solid mechanical member comprises a hammer, piston or hydraulic ram.

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41. A method as claimed in any one of claims 37 to 40 wherein a compaction force of several hundreds of tonnes is applied to achieve maximum compaction of the receptacle.

5 42. A method as claimed in claim 41 wherein said compaction force is 200-2000 tonnes.

43. A method as claimed in claim 42 wherein said compaction force is 1000-2000 tonnes.

10 44. A method as claimed in any preceding claim wherein the residue is subsequently despatched for storage or disposal.

15 45. A method as claimed in any preceding claim whenever applied to the treatment of Intermediate Liquid Waste in the nuclear industry.

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